en

Operator's manual

Log loader
A 934 C HD Litronic Pick & Carry

from serial number 57000

Document identification

	ORIGINAL OPERATING MANUAL
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Product identification

Manufacturer:	LIEBHERR Hydraulikbagger GmbH
Type:	A 934 C HD Litronic Pick & Carry
Type no.:	1053
Conformity:	CE

Address

Liebherr Hydraulikbagger GmbH
Liebherr-Straße 12
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1.1.3 Undercarriage

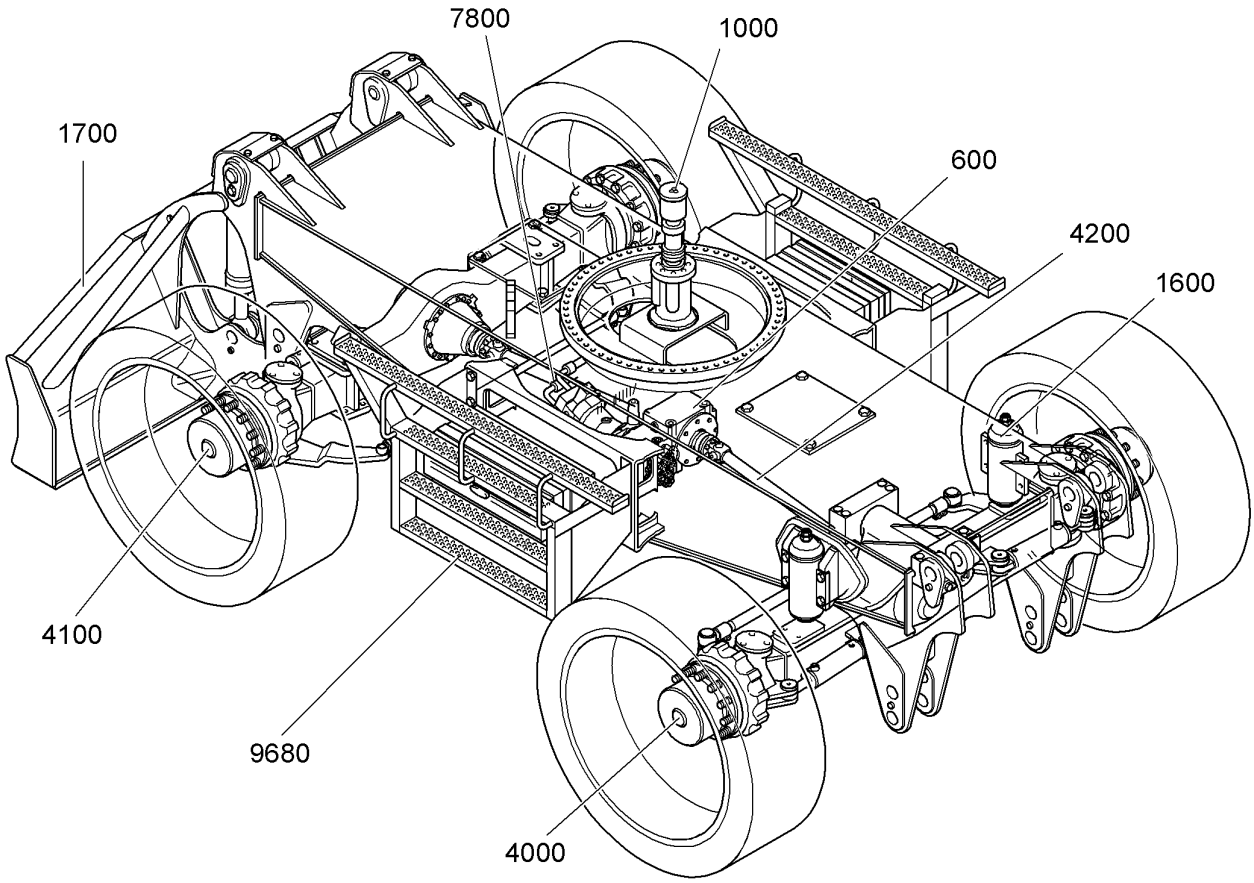

Fig. 1-3 *Undercarriage*

600 Transmission
1000 Rotary connection
1600 Oscillating axle support
1700 Blade support
4000 Oscillating axle
4100 Rigid axle
4200 Drive shaft
7800 Hydraulic travel drive
9680 Ladder with toolbox

1.2 Vibration emissions

The operator seat built into the machine by the manufacturer conforms to ISO 7096:2000, EM 6. When replacing the seat, ensure that the new seat also conforms to this standard.

Hand-arm vibration

If the machine is operated according to the manufacturer instructions, the weighted (frequency-rated) effective hand-arm vibration is below 2.5 m/s² according to ISO 5349-1:2001.

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Equipment

Undercarriage

	s	o
Two circuit travel brake with accumulator	•	
Four wheel steering	•	
Travel motor protection		
Outrigger zylinder rod guards		
Creeper speed electrically switchable from cab	•	
Steering reversal control	•	
Service free parking brake	•	
Choice of tires		
Auto check valve directly on each stabilizer cylinder	•	
Proportional power steering	•	
Customized colors		•
Two lockable storage boxes	•	
Two-speed power shift transmission	•	

Uppercarriage

	s	o
Electric fuel tank filler pump		•
Maintenance-free swing brake lock	•	
Handrails, Non slip surfaces	•	
Main switch for electric circuit	•	
Engine hood with lift help	•	
Pedal controlled positioning swing brake	•	
Reverse travel warning system		•
Sound insulation	•	
Customized colors		•
Pin lock upper/lower		
Maintenance-free HD-batteries	•	
Extended tool kit		
Lockable tool box	•	
Tool kit	•	

Hydraulics

	s	o
Hydraulic tank shut-off valve	•	
Extra hydr. control for hydr. swivel		
Pressure compensation	•	
Hook up for pressure checks	•	
Pressure storage for controlled lowering of attachments with engine turned off	•	
Filter with partial micro filteration (5 µm)	•	
Electronic pump regulation	•	
Stepless mode system (ECO)	•	
Flow compensation	•	
Four mixed modes, can also be adjusted	•	
Full flow micro filtration		•
Bio degradable hydraulic oil		•
Tool Control		•
Additional hydraulic circuits		•

Engine

	s	o
Turbo charger	•	
After-cooled	•	
Sensor controlled engine idling	•	
Unit pump system	•	
Air filter with pre-cleaner main- and safety element	•	

Operator's Cab

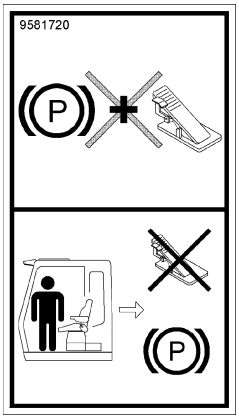
	s	o
Storage tray	•	
Displays for engine operating condition	•	
Mechanical hour meters, readable from outside the cab	•	
Roof hatch	•	
All-round adjustable roof vent		
6-way adjustable seat	•	
Airpressure operator seat with heating and head-rest		•
Seat and consoles independently adjustable	•	
Extinguisher		•
Removable customized foot mat	•	
Dome light	•	
Rigid cab elevation		•
Cab heater with defroster	•	
Cloth hook	•	
Air conditioning	•	
Electric cool box		•
Steering wheel adjustable	•	
Bullet proof window (fixed installation – can not be opened)		•
Stereo radio		•
Preparation for radio installation		•
Rain hood over front window opening	•	
Beacon		•
All tinted windows	•	
Door with sliding window	•	
Auxiliary heating		•
Sun shade		•
Sun roller blind	•	
Electronic drive away lock		•
Wiper/washer	•	
Cigarette lighter and ashtray	•	
Additional flood lights		•

Attachment

	s	o
Flood lights	•	
Hydr. lines for clam operation in sticks	•	
Industrial-type gooseneck sticks with remote hydraulic pin puller		•
Sealed pivots	•	
Safety lift hook		•
Liebherr line of clams		•
Liebherr semi-automatic central lubrication system	•	
Liebherr fully-automatic central lubrication system		•
Likufix		•
Safety check valves on hoist cylinder	•	
Safety check valves on stick cylinder	•	
Hose quick connection	•	
Hydraulic or manual quick change tool adapter		•
Customized colors		•
Special buckets and other tools		•
Overload warning device		•
Two way valves for bucket/clam use		•
Locking of connections for clam operation		•
Cylinders with shock absorber	•	

S = Standard, O = Option

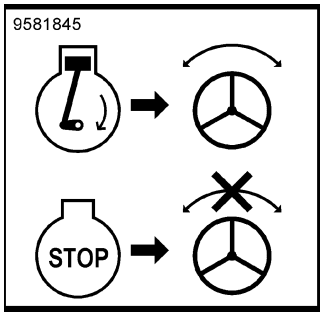
Options and/or special attachments, supplied by vendors other than Liebherr, are only to be installed with the knowledge and approval of Liebherr to retain warranty.



67: Working brake / parking brake

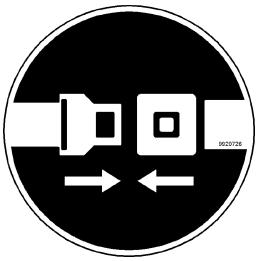
During machine operation, do not simultaneously apply the working brake and the parking brake.

The working brake may only be applied when the machine is in operation. When exiting the operator's cab, do not use the working brake as a parking brake.



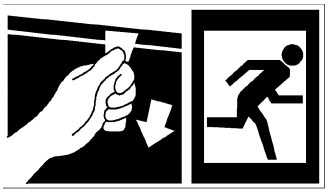
70: Steering

The steering system can only be operated when the vehicle engine is switched on.



80: Seat belt

Before starting the machine, put on the safety belt.



250: Emergency exit through rear window

Pull the handle on the inside of the rear window to remove the rubber insert. Push the rear window outwards.

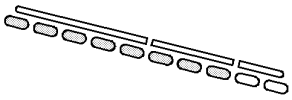
S56– No function

S85 – No function

S86– Mode selection, throttle control

Four different modes can be selected by pressing the switch. The currently active mode will be displayed by the LED under the letter.

– **L**: LIFT mode (RPM level 5)
– **F**: FINE mode (RPM level 10)
– **E**: ECO mode (RPM level 8)
– **P**: POWER mode (RPM level 10)



P4– Engine RPM display

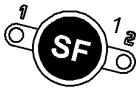
The Diesel engine RPM range is displayed in 10 levels.

S228 – Increase RPM

▶ Press switch.
  ↳ RPM will be increased by one level.
  ↳ A second LED to the right lights up in display P4.

S229 – Decrease RPM

▶ Press switch.
  ↳ RPM will be decreased by one level.
  ↳ A second LED from the right turns off in display P4.



S354 – No function

❑ Service has not been carried out:

▶ Press the **BACK** button.
  ↳ The submenu is closed.

Tool Control menu - Selection of working tool settings

This menu is used to assign pre-set pressure and flow reductions to the working tools (activation of foot pedals, e.g. for hydraulic hammer or grapple).

Caution!
Incorrect pressure or flow reduction settings may result in damage to the working tool (e.g. hydraulic hammer) or impair its functions (e.g. mill).

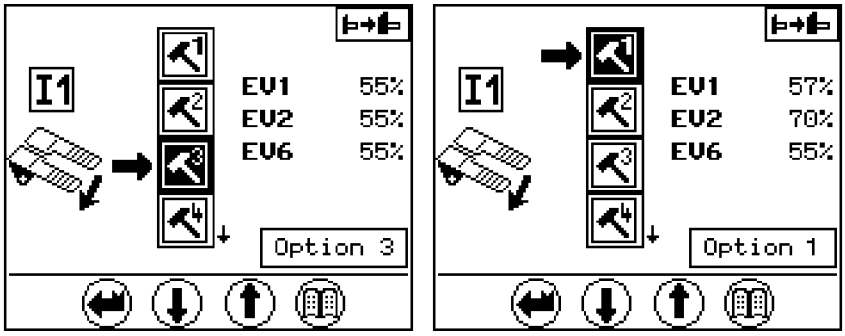


Fig. 3-11 *Tool Control menu*

EV1 = oil volume 1 **EV2** = oil volume 2 (from A 934 B LI)
EV6 = pressure

The currently activated option is highlighted by a black background. To select a different option, move the arrow and press the **Menu** button.

In the example (see Fig. 3-11) option 3 is initially activated.

▶ Press the **UP** or **DOWN** button.
  ↳ A different pre-defined option (1 - 10) can be selected (e.g. if the working attachment has been changed).

▶ Press the **Menu** button.
  ↳ Your selection is confirmed.
  ↳ The selected option is activated, and the symbol is highlighted by a black background (in the example: option 1).

To exit the submenu:

▶ Press the **BACK** button.
  ↳ The submenu is closed.
  ↳ In the main menu, the selected working tool is shown (e.g. "Option 1"), and the selected pressure and flow combination is available.
  ↳ The working tool is now operated at reduced oil pressure / reduced flow rate.

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First bleed the empty fuel system manually. Some air remains however in the fuel high pressure system. This air can only escape when the diesel engine is started.

The purge mode assists this process. The fuel high pressure system is automatically bled, so that the diesel engine starts better.

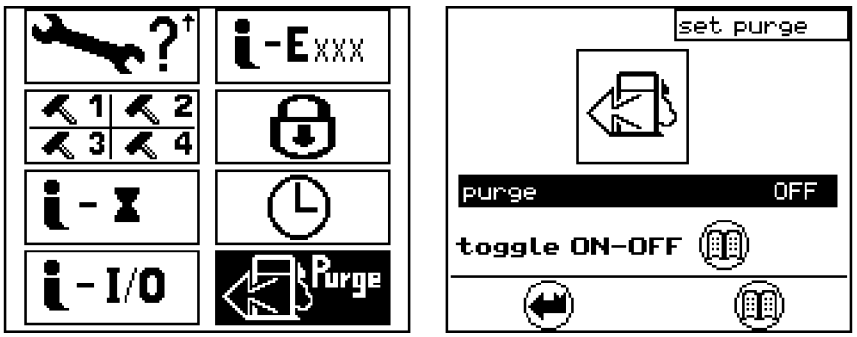

Fig. 3-30 *Purge menu*

- ▶ Press the **Menu** button.
  - ↳ The purge mode is activated (purge = ON)
- ▶ Start the diesel engine. For detailed instructions, see chapter "Fuel system maintenance".

3.2 Control

3.2.1 Entering and exiting the operator's cab

Caution!
Risk of injury when operator's cab is entered or exited without due regard to the safety instructions!

- ▶ When entering and exiting the operator's cab, ensure that the safety lever is in its top position.
- ▶ Always access and descend from the machine using the provided climbing aids.
- ▶ Ensure that your body is resting on at least 3 points: Hold on to the machine with both hands when raising a foot, and stand on both feet when letting go with one hand.
- ▶ Do not use operating elements as handles.
- ▶ Never jump from the machine.

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3.2.10.3 Windshield washing fluid container

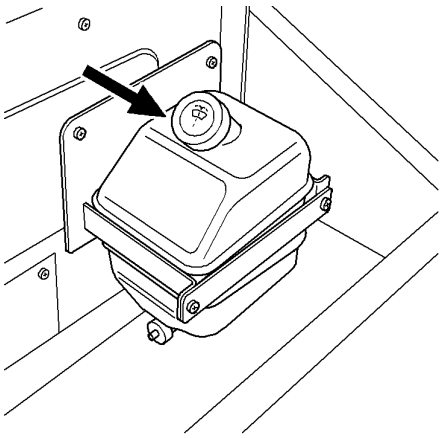

Fig. 3-41 *Windshield washing fluid container*

The container for the windshield washing fluid is located at the rear of the cab.

Open the cover (see arrow) to refill the container with commercially available windshield washing fluid.

Quantity: see Lubrication Chart

3.2.10.4 Window wiper on the cab roof (option)

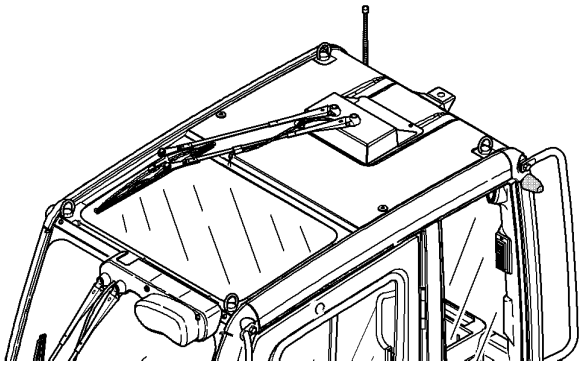

Fig. 3-42 *Window wiper on cab roof*

With the ignition turned on, press the switch **S218** in the right control panel to activate the windshield wiper on the cab roof.

- ▶ Press switch **S218**.
  - ↳ The windshield wiper on the cab roof runs continuously.
- ▶ Press switch **S218**.
  - ↳ The windshield wiper on the cab roof is turned off.

3.3.2 Starting machine

3.3.2.1 General instructions

Note!
When using the machine above a certain height above sea level and at low ambient temperatures, the performance and the service life of the diesel engine with turbo charger is considerably reduced.
Under such conditions, there is an increased risk of overheating of the coolant circuit and the hydraulic oil.

To prevent damage to the diesel engine, the output of the engine is automatically in line with the elevation above sea level and the ambient temperature.

Simultaneously observe the coolant circuit and the hydraulic oil cooling system.

3.3.2.2 Tasks to be completed prior to machine start

Caution!
A fire can only be extinguished, if it is accessible.

▶ Before starting the machine, open all locks of the hydraulic excavators panels.
  ↳ In the event of a fire, these doors can than be opened without delay to extinguish the fire.

Position of the locks: see chapter "Maintenance".

Caution!
When the tasks listed below are completed and the machine is already at operating temperature, there is risk of injury from scalding by hot coolant or oil.

▶ Before completing the tasks described below, read the respective sections in chapter "Maintenance".

Before starting the machine, carry out the following routine procedure:

– Check oil level in engine*.
– Check coolant level of diesel engine*.
– Check oil level in hydraulic tank*.
– Remove water from fuel system*.
– If necessary, remove ice and snow from the cooling air and combustion air intake openings.

* For instructions on how to complete these tasks, refer to chapter "Maintenance".

3.3.2.3 Deactivating the electronic immobiliser (optional equipment)

On request, the machine can be equipped with an electronic immobiliser.

Prior to start-up the electronic system checks whether the ignition key code is correct. If this is the case, the control system is enabled.

The machine is delivered with two sets of keys (blue and red):

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3.3.6 Travelling operation

- ❑ Always put on your safety belt before starting to travel.
- ❑ The uppercarriage must be positioned in the travel position relative to the chassis when travelling, i.e. steering axle (oscillating axle) to front, rigid axle to rear.
- ❑ The uppercarriage and undercarriage must be bolted together using the locking pin for on-road travelling.

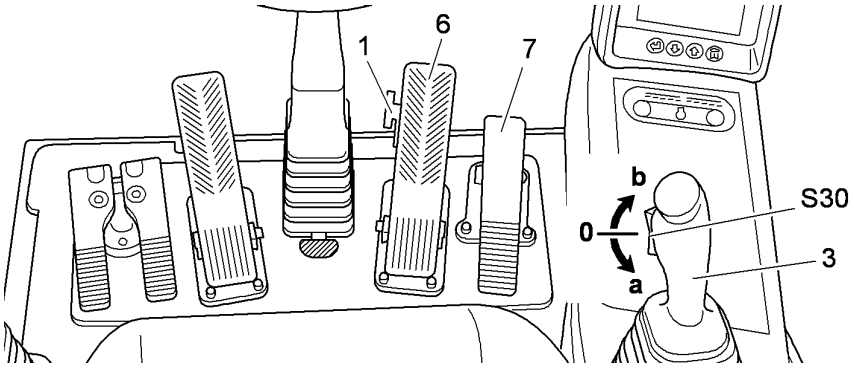

Fig. 3-59 *Control elements, travelling*

1	Retainer	**7**	Travelling pedal
3	Joystick, right	**S30**	Travel direction rocker switch
6	Brake pedal		

- ▶ Release parking brake **S16**.
- ▶ Before moving off, use your foot to open retainer **1** on brake pedal **6**.

3.3.6.1 Gear selection

The machine is equipped with a power shift 2-gear transmission with shift lock.

– 1. gear: low travel speed
– 2. gear: the maximum travel speed can be reached

- ❑ 2. gear is preselected

- ▶ Press switch **S42**.
  - 1. gear is selected.
  - Left LED in the switch illuminates.
  - The first gear is automatically selected when the speed drops to a sufficiently low value.
- ▶ Press switch **S42** again.
  - 2. gear will be selected immediately.
  - Left LED in the switch goes out.

3.3.6.2 Creeper gear

Note!
The creeper gear should be selected when stationary or during slow travelling in order to prevent the machine braking in a jerky manner.

The creeper gear can be selected before or during the journey to obtain better tractive power on gradients and difficult terrain.

Deactivating emergency release:

- ▶ Loosen the bleeder **2** using a wrench and open it until grease escapes.
- ▶ Start the diesel engine.
- ▶ Release the parking brake while the working brake (pedal) remains applied.
- ▶ Repeatedly shift gear.
- ▶ Leave the bleeder open until no grease escapes.
- ▶ Switch off the diesel engine.
- ▶ Close and tighten the bleeder **2**.
  ↳ The transmission is re-engaged.

3.3.13 Oscillating axle locking device

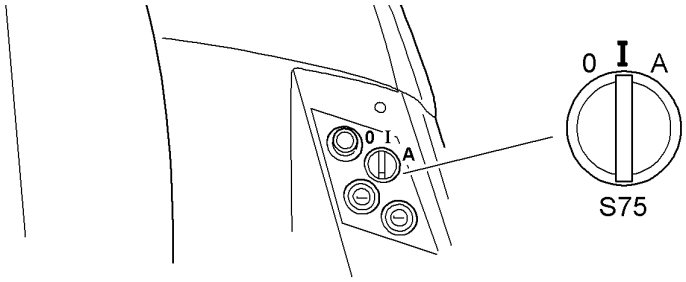

Fig. 3-68 *Oscillating axle locking device*

The oscillating axle can be operated locked (rigid) or unlocked (oscillating). The relevant selection is chosen with the switch **S75**.

S75	Function	Application
0	Oscillating axle unlocked	Travel operation without load, on-road travel
1	Oscillating axle locked	Working and moving machine with attached load
A	Automatic oscillating axle locking; the oscillating axle is automatically locked when the working brake is applied. Preconditions: **S35** is switched on.	Working, travel operation without load

Tab. 3-1 *Functions of the oscillating axle*

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❑ Generally the machine should be supported when working with it.

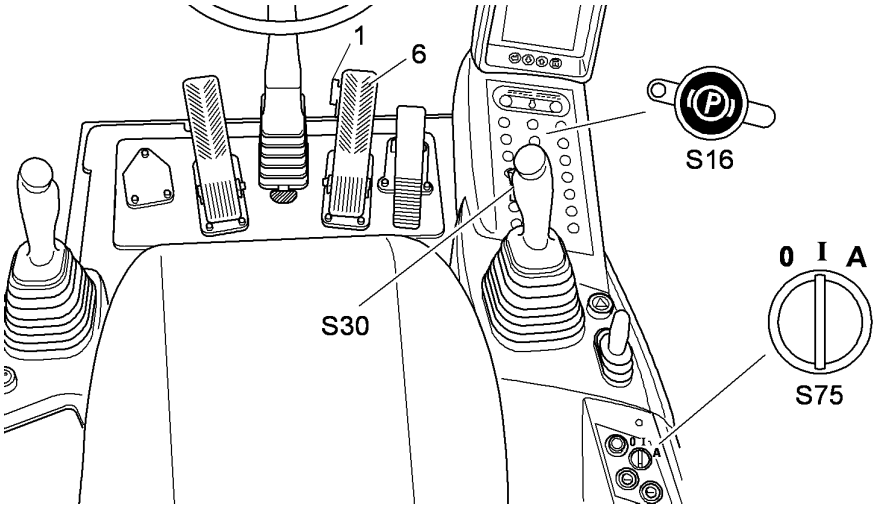

Fig. 3-74 *Locking the full floating axle*

1 Pawl **6** Brake pedal

Caution!

❑ Parking brake **S16** must not be engaged.
↳ A buzzer warning signal will sound when the parking brake is engaged.

❑ Preselector switch **S30** for forward/reverse driving must be set to position **0**.

▶ Press down fully on brake pedal **6** until pawl **1** engages.

To lock the full floating axle:

▶ Turn switch **S75** to position **1**.
↳ Floating axle is fully locked.
- **or** -

▶ Turn switch **S75** to position **A**.
↳ Lock full floating axle using the brake pedal.

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3.4.9.4 Adjusting the limit switches

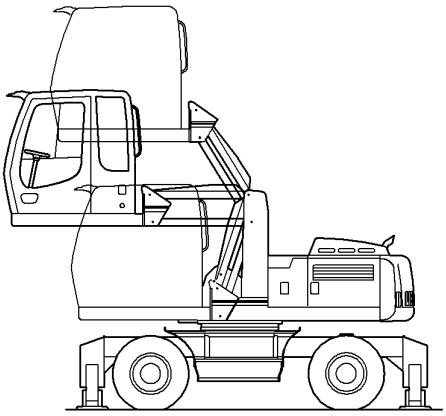

Fig. 3-84 *Elevating operator's cab*

Always maintain a safety distance of 1.5 m to the danger point (operator's cab, other objects in the vicinity).

- ▶ Move the boom upwards.
- ▶ In machines with elevating operator's cab, move the cab to its most extended position, (see Fig. 3-84).

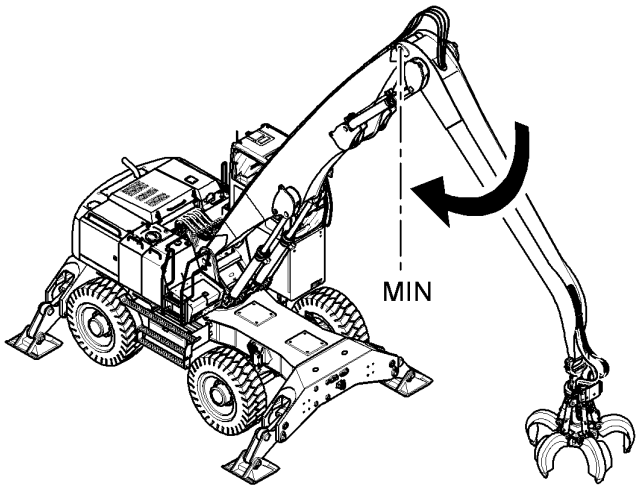

Fig. 3-85 *Stick cylinder shut-down point*

- ▶ Move the boom upwards.
- ▶ Retract the industrial stick all the way to the desired shut-down point (MIN).
- ▶ Shut down the diesel engine and push the safety lever upwards.

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– Before locking or releasing the quick-change adapter, tilt the safety lever upwards.
– When attaching and removing working tools, ensure that no persons are located in the working area of the tool.
– During mounting and removing, move the working tool only at minimum speed, and only if absolutely necessary.
– Position the working tool as little above the ground as is necessary before starting the locking or release procedure, in order to avoid dangerous movements.
– If required, use a pedestal or working platform to reach the locking bolts and connections. Do not stand on the working tool.
– Check the locking screw every day to ensure that it is properly tightened.
– The quick-change adapter is equipped with an integrated safety load hook for the safe attachment of lifting tackle, such as cables or chains. To use lifting tackle, you must use a suspension system with a safety load hook.
– Switch on the magnet system (optional equipment) while attaching or removing the working tool.

3.5.5.2 Positioning option

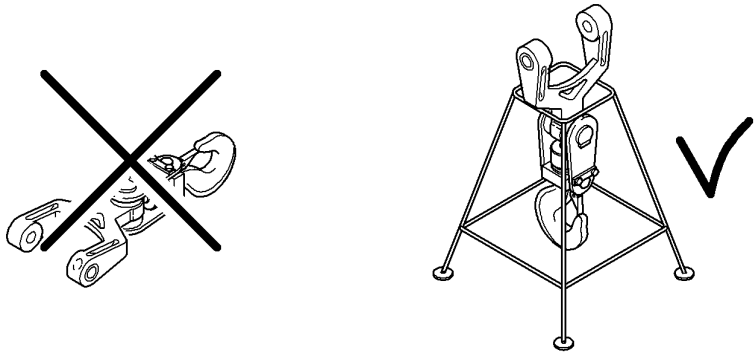

Fig. 3-98 *Example: Load hook in frame (bearing block)*

Working tools that are prone to tilting or cannot be placed on the ground must be secured. For attachment and removal use suitable equipment (e.g. frames, etc.).

3.5.5.3 Overview

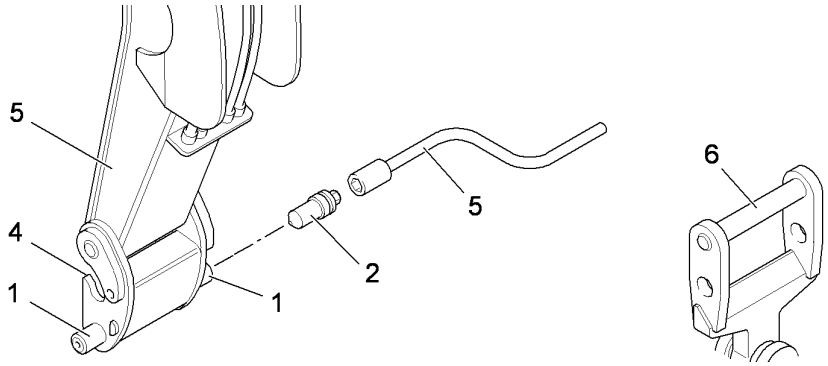

Fig. 3-99 *Industrial stick with mechanical quick-change adapter*

1 Locking bolt (extended) **2** Locking screw

– During mounting and removing, move the working tool only at minimum speed, and only if absolutely necessary.
– If the buzzer or the "quick-change adapter" icon are on, when you are not carrying out an intended locking or release procedure, immediately shut down the machine. If these indicating elements are not on when you are carrying out an intended locking or release procedure, immediately stop the procedure.
The alarm signals can be triggered if a locking pin has inadvertently become dislodged, or if a mechanical, hydraulic or electrical fault occurs. Only resume operation after the defective part has been repaired or replaced.
– The quick-coupling system is not equipped with an integrated safety load hook for the safe attachment of lifting tackle, such as cables or chains. To use lifting tackle, you must use a suspension system with a safety load hook.
– Switch on the magnet system (optional equipment) while attaching or removing the working tool.

3.5.7.2 Positioning option

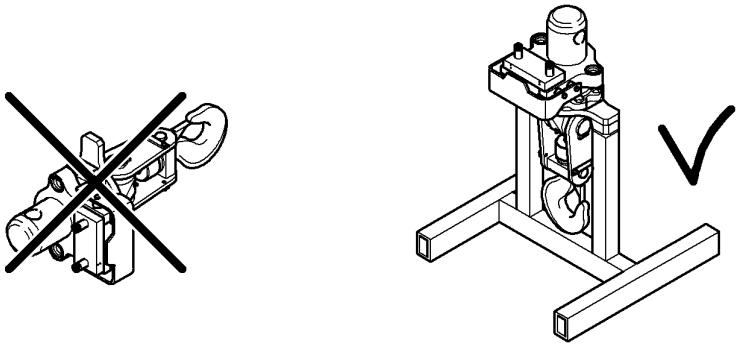

Fig. 3-113 *Example: Load hook in frame (bearing block)*

Working tools that are prone to tilting or cannot be placed on the ground must be secured. For attachment and removal use suitable equipment (e.g. frames, etc.).

3.5.7.3 Overview

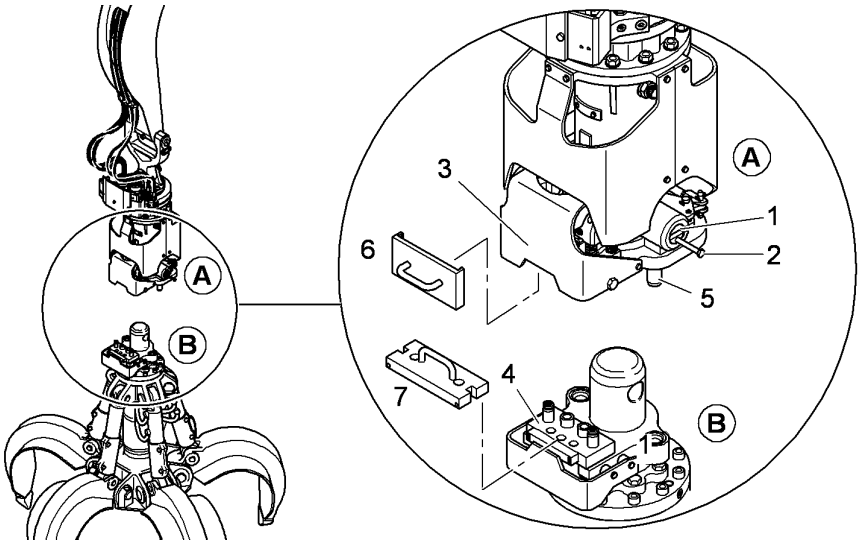

Fig. 3-114 *LIKUFIX MH 110 quick-coupling system*

Mode of operation

The overload warning device comprises a constant pressure switch which is connected to the piston of the hydraulic jack.

If the load pressure in the hydraulic jack reaches the level of the switching pressure, the pressure switch emits a signal, a warning symbol appears on-screen and the buzzer sounds.

The switching pressure of the pressure switch is selected in such a way that the stability criteria can be fulfilled even when in an unsupported state (small stationary torque).

Startup procedure

Danger!
No load hoisting work should be carried out if the overload warning device is defective.

▶ Have the overload warning device repaired by a professional.

▶ Press switch **S18**.
  ↳ Overload warning device is activated.
  ↳ LED in switch illuminates.

Note!
The overload warning device must be checked before it is first used and on an annual basis by a professional in accordance with the testing and adjustment instructions given in the service manual.

The operator must check the correct function of the overload warning device before each work shift.

▶ To check the overload warning device, extend the hydraulic jack to the stop position.

▶ Push the joystick further in the the "Raise boom" direction.
  ↳ The warning symbol must illuminate.
  ↳ The buzzer must sound.

Note!
When working with a bucket, deactivate the overload warning device as the increased effort of the machine will cause the overload warning device to be permanently active.

▶ Press switch **S18** again.
  ↳ Overload warning device is deactivated.
  ↳ LED in the switch goes out.

3.6.7.3 Switchable overload warning device

Danger!
Observe the relevant accident prevention regulations when carrying out load hoisting work with the machine.
The overload warning device does not shut down the machine if the permissible load moment is exceeded. The operator of the machine will only be informed of the situation.

General error codes			
Error code	**Effect**	**Cause**	**What you can do**
E 135	Error is displayed	5V reference 1 defective	Contact LIEBHERR customer service.
E 136	Error is displayed	5V reference 2 defective	
E 137	Error is displayed	5V reference 3 defective	
E 138	Error is displayed	5V reference 4 defective	
E 302	Input through keyboard not possible	No code plug X42	Contact LIEBHERR customer service.
E 303	Diesel engine speed cannot be adjusted through keyboard; reduced hydraulic power Reduced hydraulic power in PLD machines	No CAN bus connection between keyboard and BST printed circuit board (message is also displayed, if BST is not ready for operation, e.g. if not powered)	Switch to emergency speed adjustment S71 and S72 and emergency operation of working pumps Y50, emergency operation of working pumps Y50 (only in PLD machines). Contact LIEBHERR customer service.
E 305	Malfunction, e.g. in travel brake, slewing gear brake, servo steering	No CAN bus connection between keyboard and ESP01 printed circuit board (message is also displayed, if ESP01 is not ready for operation)	Switch to emergency operation of servo pressure circuits S73. Contact LIEBHERR customer service.
E 306	Malfunction, e.g. in travel direction switch, gear shifting system, oscillating axle locking mechanism, accessory kits	No CAN bus connection between keyboard and ESP02 printed circuit board (message is also displayed, if ESP02 is not ready for operation)	Contact LIEBHERR customer service.
E 307	Speed adjustment not possible PLD electronics **A 700**	No CAN bus connection between keyboard and PLD diesel engine regulating unit (message is also displayed, if PLD regulator is not ready for operation)	Contact LIEBHERR customer service.
E 308	No or incorrect display	No connection of keyboard to display; keyboard defective	Contact LIEBHERR customer service.
E 309		Software incompatibility between keyboard and display	
E 314	Diesel engine switches to emergency mode	Time-out of PLD	Contact LIEBHERR customer service.
E 319	Diesel engine speed cannot be adjusted through keyboard; reduced hydraulic power. Code plug **X42** Hardware coding **X44**	Hardware coding does not match software coding	Switch to emergency speed adjustment S71 and S72 and emergency operation of working pumps Y50. Contact LIEBHERR customer service.
E 321		No known machine type received from keyboard.	
E 322		Unknown hardware coding	
E 442	Failure of idle automatic at left joystick, engine remains at lower speed Handle sensor **B19L**	+ 24 V short circuit	Deactivate idle automatic S20. Call LIEBHERR customer service.
E 443		Short to ground or wire break	

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▶ Before exchanging a fuse or relay, set the battery main switch to position **0** (OFF).

4.3.1 Fuse box E50

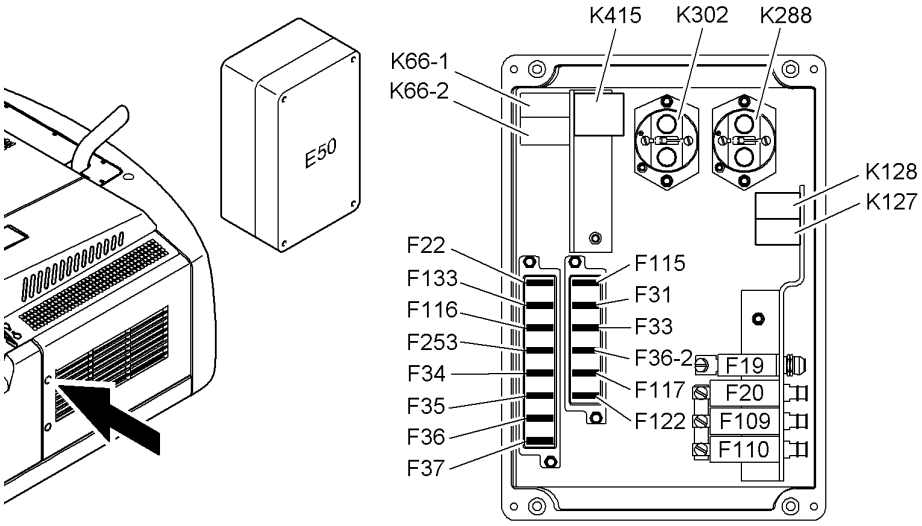

Fig. 4-2 *Fuse box E50*

The E50 fuse box is located behind the left side door above the batteries.

▶ Remove the lid of the fuse box and replace it after the fuse has been replaced.

F19	100 A	Pre-heating
F20	50 A	Main fuse
F22	7.5 A	Warning light system
F31	7.5 A	Heating and a/c system terminal 15
F33	7.5 A	Refuelling pump*
F34		Reserve
F35		Reserve
F36	20 A	Refuelling pump*
F36-2	15 A	Stroke limitation / stick cylinder shut-down*
F37	20 A	Heating and a/c system terminal 30
F109	50 A	Optional equipment and auxiliary headlight*
F110	50 A	Engine control terminal 30
F115	7.5 A	Emergency operation terminal 15
F116	7.5 A	Engine control terminal 30
F117	7.5 A	Engine control terminal 15
F122	7.5 A	Engine control, preheating monitoring
F133	7.5 A	Elevating operator's cab*
F253	25 A	Attachment light
K66-1		Stroke limitation / stick cylinder shut-down*
K66-2		Stroke limitation / stick cylinder shut-down*
K127		Relay of emergency operation / speed control
K128		Relay of starting engine emergency operation
K288		Main relay terminal 15
K302		Relay of pre-heating
K415		Relay of attachment light

* optional equipment

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The machine has 5 access doors for maintenance. Some of the doors are secured by means of lockable handles or fittings. The locks integrated in the handles must be unlocked before commencing work.

Caution!
Access doors can close accidentally and trap the machine operator or maintenance personnel.

▶ When you have opened the access doors, lock them using the retainer.

No.	Access doors	Access to:
1	Centre hood	– Diesel engine – Radiator
2	Right hood	– Diesel engine – Control oil unit
3	Side door, left	– Radiator – Electric cabinet E50 – Batteries
4	Side door, front left	– Toolbox – Stowing compartment – Battery main switch
5	Side door, right	– Dry air filter – Control oil unit – Hydraulic pump

Tab. 5-1 *Access doors*

5.2.2 Door locking mechanism

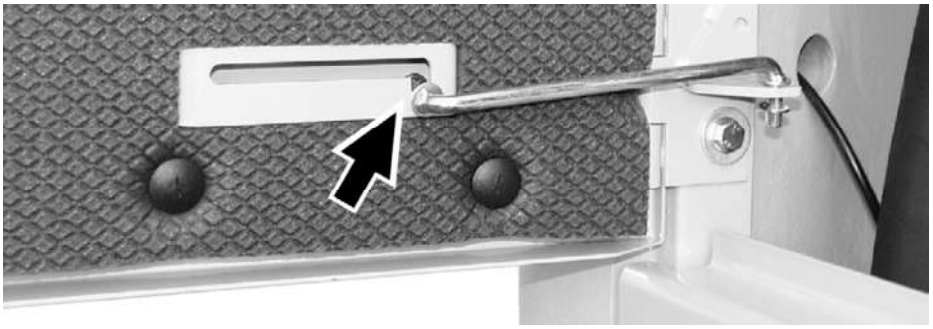

Fig. 5-2 *Door locking mechanism*

▶ To prevent the access doors from moving unintentionally (e.g. due to wind), open them fully and allow the door locking mechanism (see arrow) to latch.

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5.5.3.2 Water (fresh water)

Clear and clean water free of particles that meets the following chemical requirements is suitable for use as a coolant.

Do not use sea water, brackish water, brine or industrial wastewater.

Designation	Value / unit
Total alkaline earth metals (water hardness)	0.6 to 3.6 mmol/l (3 to 20 °dH)
pH at 20 °C	6.5 to 8.5
Chloride ion concentration	max. 80 mg/l
Sulphate ion concentration	max. 100 mg/l

Tab. 5-5 *Fresh water quality*

Designation	Value / unit
Total alkaline earth metals (water hardness)	0.6 to 2.7 mmol/l (3 to 15 °dH)
pH at 20 °C	6.5 to 8.0
Chloride ion concentration	max. 80 mg/l
Sulphate ion concentration	max. 80 mg/l

Tab. 5-6 *Fresh water quality with use of DCA 4**

* = Diesel Coolant Additives

Water analysis results are available from the local authorities.

5.5.3.3 Mixing ratio for coolant

The coolant must contain min. 50% corrosion inhibitor and antifreeze agent at **all times of the year**.

Outdoor temperature to	Mixing ratio	
	Water %	Corrosion inhibitor/antifreeze agent %
-37 °C	50 %	50 %
-50 °C	40 %	60 %

Tab. 5-7 *Permissible mixing ratio (for all seasons)*

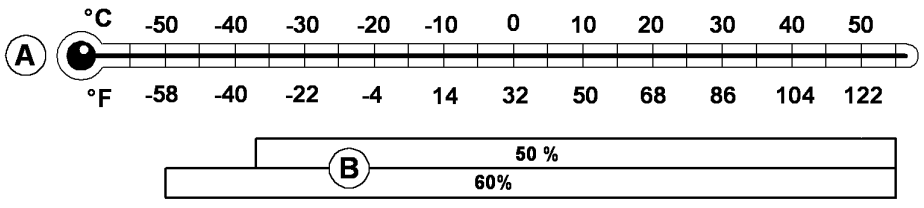

Fig. 5-8 *Temperature-based mixing ratio of water + corrosion inhibitor / antifreeze agent*

5.5.7 Grease

5.5.7.1 Quality

Recommended lubricant	Specification
Liebherr Universalfett 9900	Soap-base grease (lithium complex) KPF 2 N - 25 (DIN 51502) NLGI grade: 2 (DIN 51818) VKA welding force: > 6000 N (DIN 51350 / 4)
- Liebherr Universalfett Arctic (for low-temperature operation)	Soap-base grease (lithium complex) KPFHC 1 N - 60 (DIN 51502) NLGI grade: 1 (DIN 51818) VKA welding force: > 5500 N (DIN 51350 / 4)

The grease is used for both automatic and manual machine lubrication. it is supplied by the central lubrication system or through lubrication nipples to the respective lube points.

Examples:

– Slewing ring bearings
– Crown gears, geared wheels
– Bolts, axles and screws
– Attachments

5.5.7.2 Operating temperature

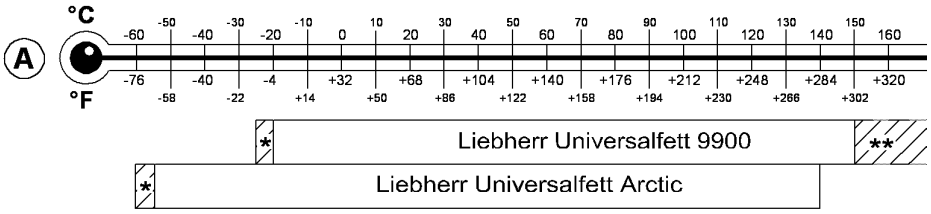

Fig. 5-12 *Operating temperature for Liebherr greases*

A Grease temperature

***** The grease is not suitable for the temperature range (shaded), if used in a central lubrication system.

****** The grease may only be within the temperature range (shaded) for short periods of time. Peak temperatures of max. 200 °C (392 °F) are possible.

5.5.8 Lubricants and care products for electrical and mechanical components

Medium, purpose	Product (manufacturer)
Contact spray for slip rings	Cramolin
Lubricant for pistons, piston nuts and for the mounting of piston rod bearings at hydraulic cylinders	Gleitmo 800
Special corrosion inhibitor for mounting recesses of sealing elements at hydraulic cylinders	Rostilo Tarp CFX

This corresponds to the refill volume of corrosion inhibitor/antifreeze agent (concentrate) to be added in order to again achieve a frost protection temperature of -37 °C.

Correcting mixing ratio

❑ The necessary refill volume is known.

▶ To correct the mixing ratio, at least the (previously determined) volume must be drained from the cooling system.

▶ Add the determined volume of corrosion inhibitor/antifreeze agent (concentrate).

▶ To achieve the required coolant level, add some of the previously drained coolant.

5.7.4.2 Coolant with corrosion inhibitor (without antifreeze agent)

When using DCA 4:

▶ Take a coolant sample and analyse the concentration using a Fleetguard CC 2602 M testing kit.

▶ If the concentration is incorrect, correct the mixing ratio (according to the values indicated by the test kit).

When using Caltex / Chevron / Havoline / Total:

The mixing ratio must always show a Brix value of $2.8_{-0.9}^{+0.9}$ % . This corresponds to 5 to 10 % of corrosion inhibitor and 90 to 95 % of water.

▶ Take a coolant sample and analyse with a Gefo refractometer.

Fig. 5-23 *Gefo refractometer 2710*

Refractometer:

– Adjusting screw for adjustment to 0-line (water line)
– Adjustment of acuity by turning the eyepiece
– Soft edge of eyepiece
– Sturdy metal housing
– Safe handling thanks to rubber jacket

Measuring procedure:

▶ Carefully clean the lid and prism.

▶ Apply 1 to 2 drops of sample liquid onto the prism.

▶ Close the lid.
↳ The liquid is distributed.

▶ Hold the device against a light-coloured background and look through the eyepiece.

▶ Adjust focus on scale and read the value at the blue separating line.

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Low pressure indicator **1** stores the maximum attained suction underpressure reached at the filter outlet when the diesel engine is running.

The appearance of the red display strip in alarm window **3** indicates that the maximum permissible underpressure of 50 mbar has been reached.

- ▶ Replace the main element.
- ▶ Press reset button **2** to clear the stored underpressure reading.

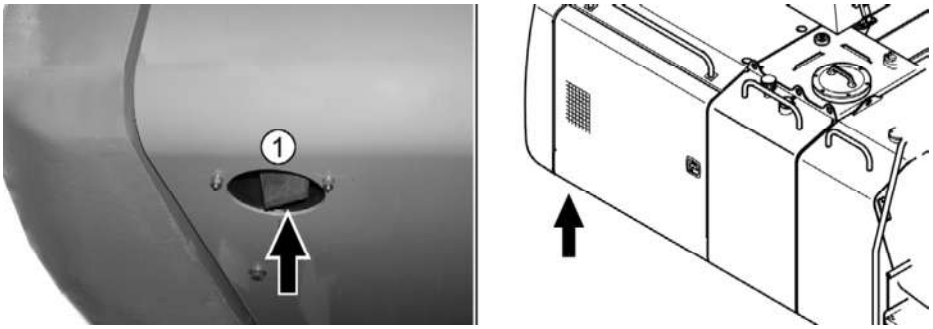

Fig. 5-37 *Dust discharge valve extractor slot*

The dust discharge valve on the dry-air filter is accessible via an opening on the underside of the engine compartment.

- ▶ Push up by hand the extractor slot on the dust discharge valve once a week to ensure that it does not stick due to humidity and dust.

5.9.1 Changing the main element

Caution!
Only replace the main element when the maximum permissible suction underpressure has been reached, or at least once a year.

Installing and removing the main element too often could damage the seals between the filter element and filter housing.

- ▶ Only replace the safety element after every third change of the main element, or at least once a year.
- ▶ Before installing a new insert, carefully clean the seal and seal contact surface in the housing.

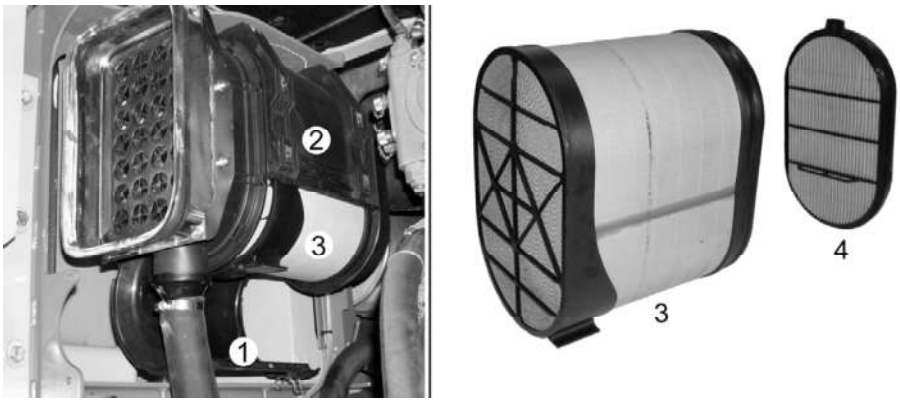

Fig. 5-38 *Changing the filter cartridges*

5.10.10 Removing the suction hose

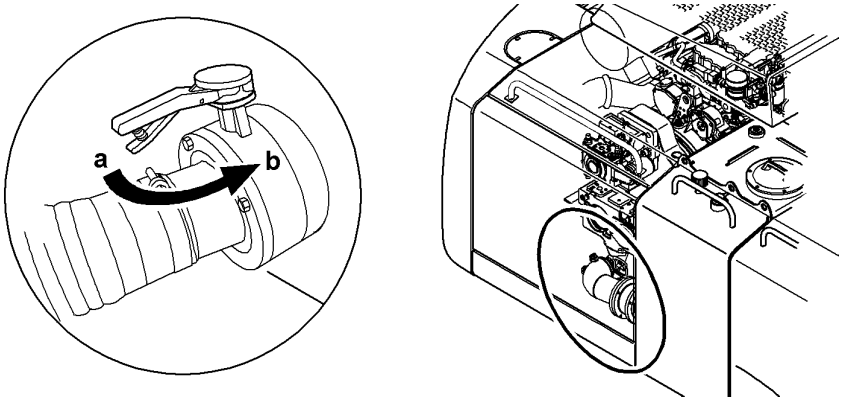

Fig. 5-48 *Suction hose, shut-off valve*

The shut-off valve of the suction hose has two positions:

– **a** open
– **b** closed

▶ If the suction hose is to be disconnected at the pump or at the hydraulic tank, close the stop cock **b**.

▶ Place a suitable container to collect the hydraulic oil under the machine.

▶ Depressurise the hydraulic system.

▶ Drain the hydraulic oil from the pump and suction hose.

▶ After completion of the repair, turn the stopcock to its initial position **a** and engage it.

▶ Tighten the breather filter on the hydraulic tank.

5.10.11 Feed line filter of the slewing gear circuit

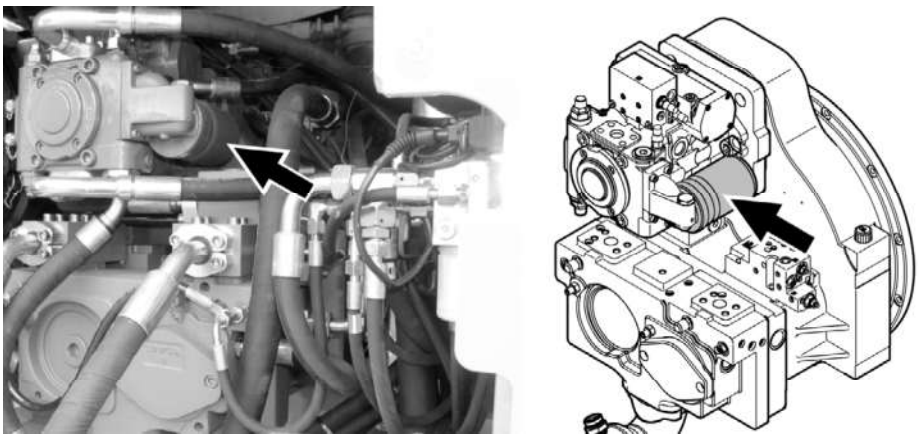

Fig. 5-49 *Feed line filter of the slewing gear circuit*

The cartridge of the feed line filter attached to the slewing gear pump must be replaced at prescribed intervals.

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- ▶ Before starting any work on the electrical system, including welding work on the machine, switch the main battery switch to position **0**.
- ▶ When washing the machine, cover the electrical units (particularly the alternator, generator, cabling, electronic components and measurement sensors) to prevent water from penetrating.
- ▶ When cleaning the engine with a water / steam jet, do not direct the jet at electrical measurement sensors such as the oil pressure switches.
  - If this happens, moisture could penetrate and lead to contact corrosion and failure of the measurement function.
  - Oil pressure switches are not watertight as their design requires membrane ventilation.

Note!
Batteries can go flat if the machine is out of service for long periods.

- ▶ Before shutting down the machine for long periods, switch the main battery switch to position **0** (off).

5.13.3 Battery care

The battery must always be kept clean to ensure it functions correctly.

- ▶ Particular care should be taken to regularly clean the pole ends and cable terminals **A** and then cover them with a thick layer of acid-proof grease (see Fig. 5-61).

Danger
Bent rubber hoses on the central degassing outlet increase the risk of explosion! The hydrogen contained in the batteries should not be allowed to build up in the battery compartment. It must be able to escape via the rubber hoses. The central degassing outlet hoses must be laid without kinks.

- ▶ Regularly check the condition of hoses **B**, particularly after installing a battery (see Fig. 5-61).

The fluid level in the cells should be 10 to 15 mm above the top edge of the plate. Only use distilled water for refilling.

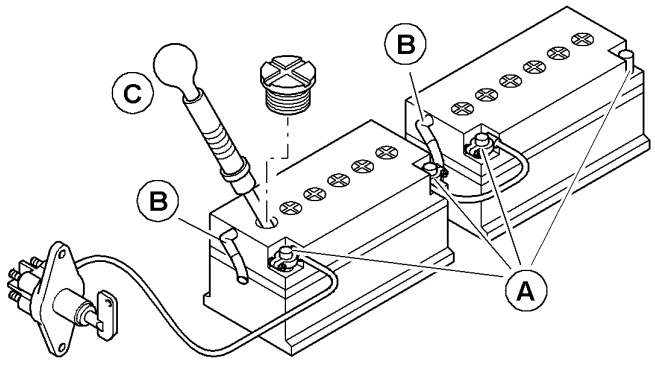

Fig. 5-61 *Battery care*

- ▶ From time to time, measure the acid concentration **C** using an acid tester.

When the battery is fully charged, the **unit weight is 1.28 kg/l (31.5° Bé)**.

- ▶ Lubricate the rotator (bearing, crown gear, pinion) using a grease gun, until clean grease escapes at the respective bearing point (approx. 2 lubricating strokes).
- ▶ If the rotator is not equipped with a separate lubricating nipple, apply grease to the crown gear and the pinion.

5.16.3 Industrial stick with mechanical quick-change adapter

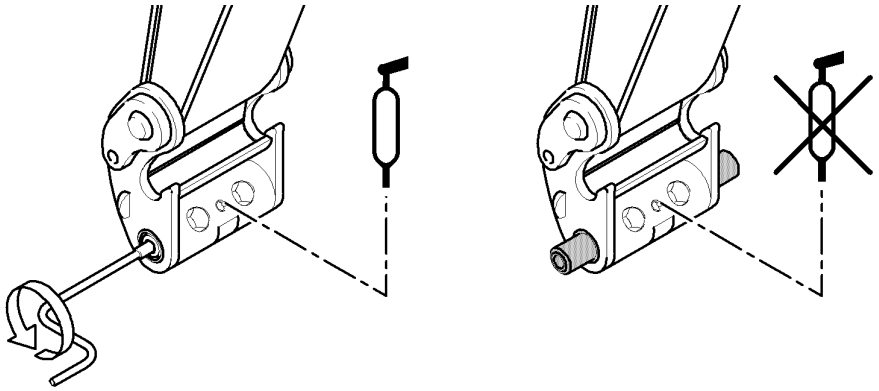

Fig. 5-72 *Lubricating the mechanical quick-change adapter*

- ▶ Lubricate the quick-change adapter through the lubrication nipples with a grease gun (approx. 2 lubricating strokes).

Note!
If the mechanical quick-change adapter is lubricated while the bolts are extended, the cavity between the locking bolts is filled with grease, so that they cannot be retracted.

- ▶ Therefore lubricate the system only, if the locking bolts are retracted.

5.16.4 Industrial stick with hydraulic quick-change adapter

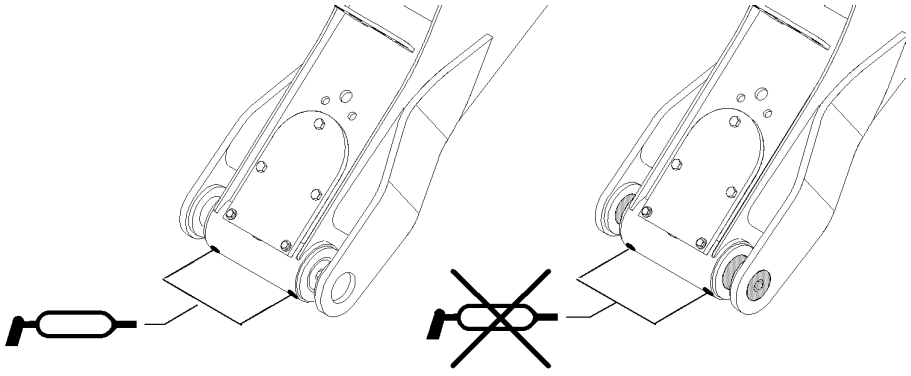

Fig. 5-73 *Lubricating the hydraulic quick-change adapter*

- ▶ Lubricate the quick-change adapter through the lubrication nipples with a grease gun (approx. 2 lubricating strokes).

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